Independent claims 1 and 16 have been amended to correct some minor typographical errors in the last clause of each claim.

The Examiner has rejected claim 11 and the claims depending on claim 11 under the provisions of 35 U.S.C. §112, second paragraph, as being indefinite because originally filed 11 claims a method and is dependent on an apparatus claim. Accordingly, claim 11 has been amended to make it clear that it is an apparatus claim. The Examiner has also rejected claims 11 and 26 because of the objectionable use of the term "can be". Accordingly, claims 11 and 26 have been amended to correct the problem noted by the Examiner.

The Examiner has also rejected claims 1-3, 6-18, 21 and 22-30 under the provisions of 35 U.S.C.§103 as being unpatentable over U.S. Patent No. 4,762,414 (Grego) in view of U.S. Patent 5,600,441 (de Groot). The Applicants respectfully request reconsideration of independent claims 1 and 16 in view of the following remarks.

The Applicants respectfully submit that neither the Grego nor the de Groot patents teach, show or suggest the means or step "for causing the measurement beam [8] to strike the object of interest [28] at an oblique angle after passing through a glass plate [25] having a polarization coating on the bottom surface [27] close to the object of interest, the oblique angle is such that the S polarization of the incident beam is reflected from the bottom surface [27] of the polarization coated glass plate and the P polarization refracts through the glass plate [25], the P polarization reflects from the substantially non-transparent object of interest [28] and refracts to the glass plate", as claimed by the Applicants. Moreover, the Grego patent does not disclose the means or step "for determining the distance between

the bottom surface [27] of the glass plate [25] and the object [28] based upon the phase difference between the measurement and reference signals", as claimed by the Applicants.

Grego specifically discloses in Figure 1 an ellipsometer to measure the refractive index and thickness of a thin opaque layer carried by a substrate. (See Col. 3, lines 45-47). Grego does not measure the distance between the polarization coated bottom surface [27] of a glass plate [25] and an object [28] as specifically claimed by the Applicants. There is absolutely nothing in the Grego patent to suggest that the apparatus of Grego can be modified to measure the distance between the polarization coated bottom surface of a glass plate and the object. The Examiner, however, states that the teachings of the de Groot patent provide a motivation for modifying the Grego device to make such a measurement. The Applicants respectfully disagree.

The de Groot reference does not teach the use of a glass plate nor a polarization coating for such a plate. In fact, the de Groot reference affirmatively teaches away from the use of such a glass plate. At Col. 4, lines 60-64, de Groot states, "However, the manufacture of the special transparent disk with the polarization coating, as taught in the Sommargren patent, can be costly and any surface imperfections might cause problems at low flying height."

In addition to affirmatively teaching away from the claimed invention, de Groot also teaches the use of a homodyne (single frequency) laser as opposed to the dual frequency light source of Grego. One skilled in the art, therefore, would also not be motivated to combine the teachings of Grego and de Groot, because the differences in their light sources.

The Applicants also want to point out that claims 4-15 and 19-30 include an acoustic optic deflector for producing scanning beams that scan along X and Y axes. The Examiner has alleged that it would have been obvious to one of ordinary skill in the art to combine the teachings of U.S. 5,160,973 (Cocito et al.) with the teachings of Grego. Again, the Applicants respectfully disagree. The Cocito et al patent does not disclose a glass plate with a polarization coating, nor is there any equivalent structure which functions in the same way as Applicants' glass plate. Moreover, while there may be a disclosure of an acoustic optic cell 2, there is no teaching of a acoustic optic deflector which scans along the X and Y axes as claimed by the Applicants.

The Applicants believe that claims 1 and 16 are patentable over the combined teachings of Grego and de Groot and that claims 2-15 and 17-30 are patentable over the prior art of record for at least the same reasons as claims 1 and 16. Accordingly, it is respectfully submitted that the present case is in condition for allowance, and the Examiner is requested to pass the present case to issue.

Respectfully submitted,

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Attachment to Amendment dated September 24, 2002

1. (Amended) A system for high speed and precision measurement of the distance between at least two near contact surfaces, one of which is an optically transparent element and the other is a substantially non-transparent element using heterodyne interferometry, comprising:

a laser source, which produces an output having two superimposed orthogonally polarized beams having S and P polarization, with a frequency difference between them;

means for splitting the polarized beams into measurement and reference beams without altering the characteristics of the polarized beams;

means for causing the reference beams to interfere;

a reference photo detector for detecting the reference beams and providing a reference signal;

means for causing the measurement beam to strike the object of interest at an oblique angle after passing through a glass plate having a polarization coating on the bottom surface close to the object of interest, the oblique angle is such that the S polarization of the incident beam is reflected from the bottom surface of the polarization coated glass plate and the P polarization refracts through the glass plate, the P polarization reflects from the substantially non-transparent object of interest and refracts to the glass plate;

means for causing the reflected S and P polarization beams from the bottom surface of the glass plate and the surface of the object respectively to interfere;

a measurement photo detector for detecting the measurement beams and providing a measurement signal; and

means for determining the distance between the bottom surface of the glass [disk] plate and the object surface based on the phase [deference] difference between the measurement and reference signals from the measurement and reference photo detectors.

11. (Amended) A [method of] system according to claim 9 for measuring the optical gap between two surfaces, one of which is transparent, [in accordance to claim 9] which further includes means for scanning beams parallel to one another by positioning the acousto optic deflector between two focusing lens such that, the distance between the two focusing lens is equal to the sum of their focal lengths, and the scanning area [can be] is increased or decreased by varying the focal length of the two focusing lenses and by positioning the acousto optic deflector closer to or away from the first focusing lens in the direction of the beam.

16. (Amended) A method for high speed and precision measurement of the distance between at least two near contact surfaces, one of which is an optically transparent element and the other is a substantially non-transparent element using heterodyne interferometry, comprising:

producing with a laser source,an output having two superimposed orthogonally polarized beams having S and P polarization, with a frequency difference between them;

splitting the polarized beams into measurement and reference beams without altering the characteristics of the polarized beams;

means for causing the reference beams to interfere;

detecting with a reference photo detector the reference beams and providing a reference signal;

causing the measurement beam to strike the object of interest at an oblique angle after passing through a glass plate having a polarization coating on the bottom surface close to the object of interest, the oblique angle is such that the S polarization of the incident beam is reflected from the bottom surface of the polarization coated glass plate and the P polarization refracts through the glass plate, the P polarization reflects from the substantially non-transparent object of interest and refracts to the glass plate;

causing the reflected S and P polarization beams from the bottom surface of the glass plate and the surface of the object respectively to interfere;

detecting with a measurement photo detector the measurement beams and providing a measurement signal; and

determining the distance between the bottom surface of the glass [disk] <u>plate</u> and the object surface based on the phase [deference] <u>difference</u> between the measurement and reference signals from the measurement and reference photo detectors.

26. (Amended) A method of measuring the optical gap between two surfaces, one of which is transparent in accordance to claim 24 which further includes scanning beams parallel to one another by positioning the acousto optic deflector between two focusing lens such that, the distance between the two focusing lens is equal to the sum of their focal lengths, and the scanning area [can be] <u>is</u> increased or decreased by varying the focal length of the two focusing lenses and by positioning the acousto optic deflector closer to or away from the first focusing lens in the direction of the beam.